How Modern Technology and Big Data can Contribute to Personalised Health and Advice - the Future has Arrived

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An Hommage to

[Image of a person]
Communication Device 1966... and 2005

Star Trek – Debut 1966

Motorola Razr – 2005

Food Replicator ~1980
Food Replicator  ... Foodini 3D Food Printer 2015

Voice Command Controlled Computers 1966
Voice Command Controlled Computers 2016

What could Alexa do for our health?
Predicting Parkinson’s Disease Severity from Patient Voice Features

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Abstract—This paper describes the machine learning methods and modeling used to predict continuous measures of Parkinson’s Disease Severity from voice recordings of patients. Two datasets are analyzed. Bagged decision trees (random forests) resulted in an improvement on the previous model accuracy for one dataset, predicting severity measures at 2% accuracy on a 0-176 scale. Other methods are described for both datasets, as well as the limitations of each.

This paper describes the models and methods we used to predict PD severity measures from voice features on the Syapse.org dataset, and also on the University of California Irvine ‘Parkinsons Telemonitoring Dataset’, another dataset containing PD severity measures and voice features, though non internet based. Reasons for analyzing both datasets are described, as is a reflection on how our work contributes to the scope of the larger Syapse.org project.

I. Introduction
But the key to mass screening is making the test \textit{as low cost as possible}. By enabling the test to occur \textit{over the telephone}, no appointments or clinician time was required – it could all be automated via technology. Little utilized Twilio, a cloud-based communication

\textbf{Alzheimer Early Recognition}
...and links to microbiome and genetic make-up?

Personal Genome & Microbiome Sequencing

[Graph showing cost per genome over time]
...and how can consumers be advised to shop right?

Amazon Go
And in Case There Is a Contamination:

Use fitness trackers:

- Personalised nutrition recommendation
- Also linked with exercise of the day/week (calories burned)

Early Warning and Consumer Protection
The Revealing Heartbeat

Normal Period

Cold onset

System Would Look at What Those People Bought (or Their Family Members)

- **Customer 1:** Cadbury’s chocolate, Mike’s Cheddar Cheese, Wensleydale Farm Yoghurt, Carrefour’s salmon
- **Customer 2:** Nespresso, DuckDuck Toilet cleaner, Target Cabbage head, Wensleydale Farm Yoghurt
- **Customer 3:** Wensleydale Farm Yoghurt, Socks size 8, Ja Toilet Paper
- **Customer 4:** Sainsbury’s Farm Orange Juice, Malboroughs Cigarettes, Wensleydale Farm Yoghurt
Integrated Analysis of Consumer Data, Product Data and Health Data

Prediction models based on health data plus purchase data will allow anticipation of many health related issues and leads to prevention of wide-spread crises
Roundup

Integrative Approaches Combining Multiple Information Sources

- Early Voice Deterioration Recognition
- Genetic Makeup / Microbiome Makeup
- Smartphone Apps to hold your medical records and recommendations for dietary needs
- Online or no-tills store interface with smartphone app to warn if, harmful or unsuitable food is purchased
- Fitbit resting heartbeat change in conjunction with online/no-tills shopping list can identify raised heartbeat of Consumers who purchased the same product and raise early warning
Sensor Fusion & Big Data

- Personalised nutrition advice
- Early recognition of neurodegenerative diseases
- Prevention of allergic reaction
- Early identification of contamination + trace-back of outbreaks

...and: all the data needed are available, just not yet integrated!

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